Research Article

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STUDY OF PREVALENCE OF IRON DEFICIENCY ANEMIA IN ADOLESCENT GIRLS IN JAIPUR DISTRICT, INDIA

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ABSTRACT

Iron deficiency anemia is the most common health problem in children and adolescents. Adolescent girls are at high risk of iron deficiency anaemia due to poor nutrition and accelerated increase in requirements for iron. The present study aims to assess the prevalence of anemia in adolescent girls (12 to 15 years), and to find its correlates. A cross sectional study was conducted from July 2015 to January 2016 by attending health check-up camps at various areas situated within 10 kilometers in Jaipur district. Hemoglobin estimation was done by using three-part auto analyzer. Statistical analysis was done using Percentages and Chi-square Test. 73.73% of adolescent girls were found anemic. Statistically significant association ($p<0.05$) was found in anemia in adolescent girls with history of iron folic acid (IFA) supplementation and deworming, diet of girls, habitat and risk factors. Present study reveals that 73.73% of adolescent girls were found anemic and the problem is significantly associated with status of IFA supplementation, de worming, type of diet and family type.

Keywords: Prevalence, Iron deficiency anemia, adolescent girls, Jaipur.

INTRODUCTION

Iron deficiency anemia is a major public health problem. It is common in all age groups particularly, in pregnant women and children but its prevalence is much high in adolescent girls. In girls, iron requirement peaks during adolescence due to rapid growth and increase in blood volume.[1] In addition; it gets precipitated by blood loss during menstruation. Anemia in adolescent girls not only effects their present health status, but also has detrimental effects in future pregnancy, that puts the women at three times greater risk of delivering low birth weight and nine times greater risk of perinatal mortality, thus contributing significantly for increased infant mortality rate and 30% maternal deaths.[2] Studies report the prevalence of anemia among adolescent is 27% in developing country and 6% in developed country[3].The Government of India has launched National Anemia Control Program , to prevent and control anaemia in children and adolescents. Iron and folic acid (IFA) syrups and tablets are supplied free to all children, adolescents and pregnant mothers by means of dispensaries and ASHA workers. Still the issue is persisting because of many reasons like- poor palatability, gastrointestinal upsets, intolerance to the drug used, poor absorption of the drugs used, constipation, discoloration of stool, unpleasant odor etc. which result in poor compliance and therefore non adherence to the therapy which finally results in poor improvement. Also the taste and side effects of presently available drugs are not suited to children and adolescence.

The Government of India, both at central and state level, collect information about the prevalence of anemia through various sources like, NFHS, DLHS and periodic surveys. Even then independent studies are also necessary to validate the findings of the above sources. With this background, the present study was undertaken with the following objectives:

- To screen adolescent girls between 12-15 years of age for the prevalence of anemia.
- To find out the correlates of the study.

Subjects: All unmarried, non-pregnant, non-lactating adolescent girls (12-15 years) were included in the study (n=472).

METHODS

A cross sectional study was conducted from July 2015 to January 2016 by attending health check-up camps at various areas situated within 10 kilometers in Jaipur district. The field practice area is slum area, out of which one area consisting of five villages was selected by simple random sampling. The population of the area is approximately 10,000. Considering P= 0.7, with 10% error, the sample size was calculated 472. For better coverage it was decided to include all eligible adolescent girls in the study. After obtaining permission from Institutional Ethical Committee [F10(5)/EC/2014/7220], a team of investigators and lab technicians surveyed by attending health check-up camps at various areas situated in Jaipur district. After getting informed consent, information regarding socio-demographic and menstrual factors was recorded in pre-designed, pre- tested proforma. Girls were also questioned about diet, history of worm infestation, past illness in last 3 months, menstrual problems and symptoms of anemia viz. headache, fatigue, and dyspnea. All girls were clinically examined for signs of anemia. Socio-economic status was estimated according to Kuppuswamy socio-economic scale.[3]

Hemoglobin Estimation: Hemoglobin estimation was done by using three part auto analyzer. For interpretation of anemia, cut off point for Hemoglobin % was taken as <12 g/dl[4, 5]. The severity of anemia was graded as follows[6]

- Mild- 10 to <12 g/dl[3]
- Moderate- 7 to <10 g/dl[3]
- Severe- <7 g/dl[3]

Statistical Analysis: Statistical analysis was done using Percentages and Chi-square Test.

RESULTS

Out of 472 adolescent girls in the study population, 348 (73.73%) girls were found to be anemic. Majority of the girls 242 (51.27%) were having mild anemia and only12 (2.54%) girls were severely anemic. **(**Table no. 1 and 2**)**

There was an increasing trend of anemia with increase in the age of the girls. But it was statistically not significant. Most of the girls belonged to the lower middle, upper lower and lower socioeconomic class (III, IV, and V). Literacy rate among the girls was found to be 100%. An inverse relation between education of girls and anemia was observed. As the level of education of girls increased, prevalence of anemia decreased. This was found to be statistically significant (P<0.05). Girls with better level of education may be more aware regarding their own nutrition.

DISCUSSION

Study was conducted over 472 adolescent girls out of which, 348 (73.73 %%) girls were found to be anemic.

Age

Out of total 472 girls, 182 girls (38.5%) were belonging to age group 12-13years, 123 girls (26%) in age group 13-14years, and 167 (35.5%) belonged to age group 14-15 years. Majority of girls i.e. 145 (86.82%) were found anemic in the age group 14-15 years. On statistical analysis relationship between age and anemia was found non-significant (P>0.05). Some of the studies support this relationship.[7, 8, 9, 10]

Socio Economic Status

Among total 472 girls, 206 were belonging to socioeconomic class IV, 152girls in socioeconomic class III, and only 2 belonged to socioeconomic class I. Socioeconomic class IV has shown maximum number of anemic girls 170 (82.52%). The cause for anemia in lower class may be the ignorance to proper diet due to poverty and inadequate resources. Statistically this association was found non-significant (P>0.05).

Habitat

Out of total 472 girls, 241 (51.05%) girls were belonging to urban slum area and 231 (48.95%) girls' belonged to rural area. Majority of girls i.e. 196 (84.84%) were found anemic in rural area. Significant association was found between habitat and anemia in girls (p<0.05). The cause may be the ignorance to diet due to poor literacy and poor income group, which is again inability to afford proper diet. Previous studies also support the fact.[11]

Family Status

233 (49.36%) girls were from joint family and 239 (50.64%) girls were from nuclear family. Majority of girls i.e. 217 (93.13%) were found anemic from joint family. There was highly significant association between family type and anemia in girls (p=0.0002). The reason may be the ignorance and division of food in large families.

Risk Factors

Frequent illness was the most prevalent problem in daily routine in 144 (30.50%) girls. However, prevalence of anemia was more common in girls with problem of inadequate food. Frequent illness and inadequate food leads to deficiency of nutrition which is the most common cause of iron deficiency anemia in India.[12] Heavy menstrual bleeding was found second most common contributing factor for anemia. Blood loss in adolescent girls leads to blood loss and increased demand, the fact is supported by studies also (Beard, 2000)[13].Worm infestation was also common observations found in anemic girls. Statistically significant relation was found between anemia and risk factors of anemia (p=0.0507).

Receiving Food from National Program

Most of the girls 344 were not receiving food from National Program. Out of them 256 (74.41%) were found anemic. No significant relation was found between anemia and girls receiving food from National Program. The reason may be less sample size in the present study. Other studies report that iron fortification of mid-day meal was effective in significantly reducing the prevalence of anemia among school children.[14]

Diet

Out of total 472 girls, 369 (78.20%), girls were taking vegetarian diet and 103 (21.80%), girls were taking mixed diet. Majority of girls i.e. 298 (80.75%) found anemic were vegetarian. Highly significant association was found between vegetarian type of diet and anemia in girls (p=0.0068).This association has been proved in a study that anemia is more prevalent in vegetarians.[15] Vegetarian diet tends to be lower than the average requirements for riboflavin and vitamin B12 deficiencies.[16] Researches also report that vegetarian diet is low in iron and vitamin B_{12}.[17]

Menarche

Out of 472 girls 239 (50.63%) girls achieved menarche and 233 (49.37%), girls did not achieved menarche at the time of study. Anemia was found more prevalent in 198(82.84%) girls who achieved menarche. Statistically non-significant (p>0.05) association was observed between anemia and menarche. Few studies also reported no association between status of menarche and anemia which supports the present study[18, 19].

Immunization Status

97 girls among 472 girls were completely immunized while maximum numbers of girls 176 were found incompletely immunized. 75 (85.22%) girls witnessed anemia out of 88 non immunized girls. Statistical analysis revealed significant association between anemia and immunization status (p<0.05). The finding supports ignorance towards the health care which may also be reason for anemia in these girls.

Receiving IFA Tablets under National Program

Out of 472 girls only 129 (27.33%) girls were receiving IFA tablets under National Program in the survey area at the time of study. Maximum number of girls 301 (87.75%) were found anemic out of 343 girls who were not receiving IFA tablets under National Program. Statistically extremely significant (p<0.0001) association was found between anemia and girls receiving IFA

tablets under National Program. Previous studies also support the present findings.[20, 21]

Deworming

Only 139 girls out of 472, provided history of de-worming during last six months in the survey area at the time of study. 290 (87.08%) girls out of 333 without any history of de-worming were found anemic. Extremely significant association was found between anemia and H/O deworming ($p<0.0001$). Previous studies also support the present finding[22, 23]

Symptom

Most prevalent symptom found in girls was fatigue in 202 (42.79%) girls out of 472 girls. Out of them 174 (95.60%) girls were found anemic. The symptom of fatigue is most prominent in pandu roga (anemia in Ayurveda), the reason behind this may be dhatukshaya (Emaciation), ojokshaya (immune-compromised), as well as presence of raktalpata (reduced hemoglobin), in the subjects. Fatigue of anemic subject is due to decreased supply of oxygen to the body/tissue/muscular mass/cellular level, this hypoxic condition causes anaerobic oxidation and lactic acid formation, this lactic acid if not cleared within due time, present as fatigue sensation in the body. Statistically non-significant ($p>0.05$) association was found between anemia and symptoms of anemia.

Type of Anemia

Mild type of anemia was found in 242 (51.27%) girls, while moderate and severe type were found in 94(19.19%) and 12(2.54%) girls. This study shows that mild variety of anemia is more prevalent among adolescent girls.

Table 1: Common Observations of Cross-Sectional Study

Sl. no.	Factor	Classification	No. of girls (N=472)	Girls with Anemia (n=348)	% of Girls with Anemia	X2	P value
1	Age of Girls	12-13	182	111	60.99	4.579	0.1013
		13-14	123	92	73.17		
		14-15	167	145	86.82		
2	Socio economic Status	I	2	1	50	1.256	0.8688
		II	10	6	60		
		III	152	110	72.36		
		IV	206	170	82.52		
		V	72	61	84.72		
3	Habitat	Urban slum	241	152	63.07	4.363	0.0365
		Rural	231	196	84.84		
4	Family Status	Nuclear	239	131	54.81	13.654	0.0002
		Joint	233	217	93.13		
		Others	00	00	00		
5	Risk factors	Frequent illness	144	121	84.02	11.036	0.0507
		Inadequate Food	30	26	86.66		
		Poor education	52	20	38.46		
		Poor Water Supply	76	42	55.26		
		Worm infestation	62	48	77.41		
		Heavy menstrual bleeding	108	91	84.25		
6	Receiving Food From National Program	Yes	128	92	71.87	0.0474	0.8276
		No	344	256	74.41		
7	Diet	Vegetarian	369	298	80.75	7.334	0.0068
		Mixed	103	50	48.54		
8	Menarche	Achieved	239	198	82.84	3.155	0.0757
		Not Achieved	233	150	64.37		
9	Immunization Status	No immunization	88	75	85.22	11.744	0.0083
		Incomplete	176	146	82.95		
		Complete	97	43	44.32		
		Unknown	111	64	57.65		
10	IFA tablets	Receiving	129	47	36.43	22.712	<0.0001
		Not receiving	343	301	87.75		
11	H/O Deworming	Yes	139	58	41.72	17.931	<0.0001
		No	333	290	87.08		
12	Symptoms	Headache	108	70	64.81	6.202	0.1022
		Fatigue	202	174	95.60		
		Dyspnoea	82	62	75.60		
		No Symptoms	80	42	52.50		

Table 2: Distribution of anemia according to severity among adolescent girls (n=472)

Hb (g/dl)	Number of Girls	%
<7 (Severe)	12	2.54
7 to <10 (Moderate)	94	19.91
10 to <12 (Mild)	242	51.27
≥12 (No anemia)	124	26.27
Total	**472**	**100**

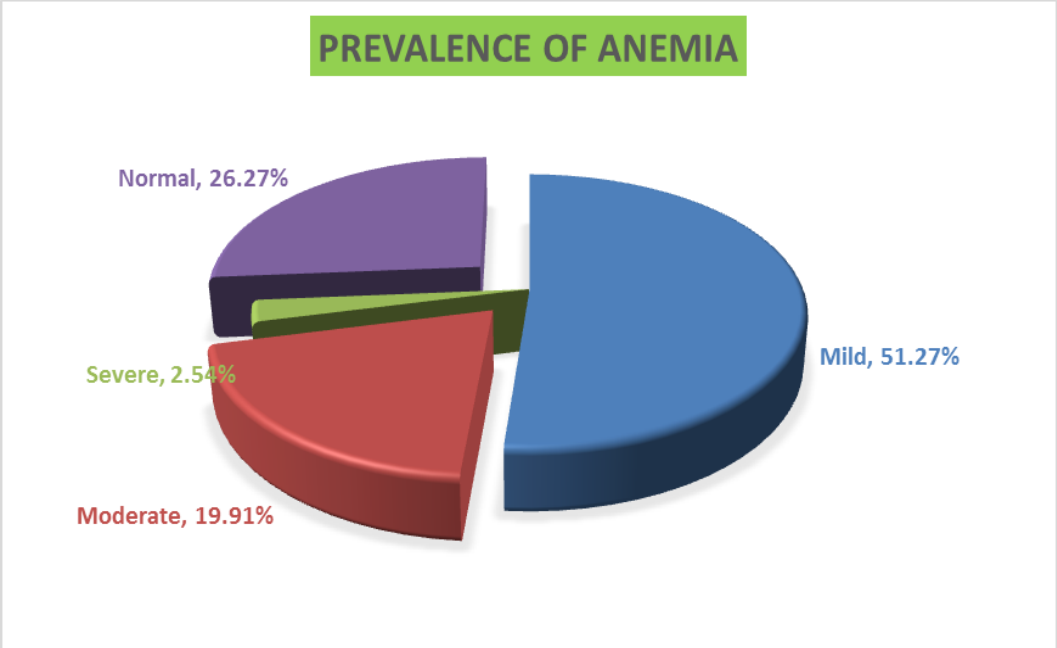

Figure 1: Prevalence of Iron Deficiency Anemia in Adolescent girls

CONCLUSION

Nutritional anemia is a major public health problem in India and is primarily due to iron deficiency. During adolescence anemia is more prevalent in both sexes due to growth spurt especially in girls where they are exposed to risk of onset of menarche. In the present study, 73.73% girls were found anemic. Mild anemia is the most prevalent type of anemia which was observed in 51.27% girls.50.63% girls in the present study, achieved menarche out of which, 82.84% girls were found anemic. Diet and family status are major contributing factors. This study reveals that regular cross-sectional studies are very much important to know the prevalence of anemia and their correlates and therefore are helpful in prevention of anemia by early intervention.

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